

Abstract Submitted
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Observation of Multiple Dark Antidark Solitons in Two-Component Bose Einstein Condensates¹ GARYFALLIA KATSIMIGA, SIMEON MISTAKIDIS, University of Hamburg, THOMAS BERSANO, MD KAMRUL HOQUE OME, SEAN MOSSMAN, Washington State University, KOUSHIK MUKHERJEE, PETER SCHMELCHER, University of Hamburg, PETER ENGELS, Washington State University, PANAYOTIS KEVREKIDIS, University of Massachusetts Amherst, THEORY GROUP OF FUNDAMENTAL PROCESSES IN QUANTUM PHYSICS TEAM, FUNDAMENTAL QUANTUM PHYSICS LAB TEAM — We report on the experimental observation of multiple dark-antidark (DAD) solitons in two-component 87Rb Bose-Einstein condensates. Particularly, our experimental efforts suggest the spontaneous generation of multiple such structures in two different formats. Namely, we present settings in which the multiple dark solitons are all in the same component and the antidark solitons are all in the second component (sorted case), as well as ones where there is an alternating sequence of darks and antidarks (in a complementary fashion) between the two components. The above observations are corroborated by theoretical predictions regarding the existence of stationary states consisting of either sorted or alternating configurations upon varying the intercomponent coupling. It is found that only ensembles of few sorted DADs exist as stable configurations, while for larger DAD arrays windows of stability are identified and discussed. On the contrary, bound states of alternating DAD solitons do not exist and thus we can infer solely their dynamical formation and interactions.

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